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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,983	10/09/2003	Chun Ho Fan	50626.60	8846
35510	7590	02/10/2005		
KEATING & BENNETT, LLP 10400 EATON PLACE SUITE 312 FAIRFAX, VA 22030			EXAMINER ANDUJAR, LEONARDO	
			ART UNIT 2826	PAPER NUMBER

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/681,983

Applicant(s)

FAN ET AL.

Examiner

Leonardo Andújar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 16 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 02/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Acknowledgment

1. The pre amendment filed on 10/09/2003 has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 10-16.

Claim Rejections - 35 USC § 102

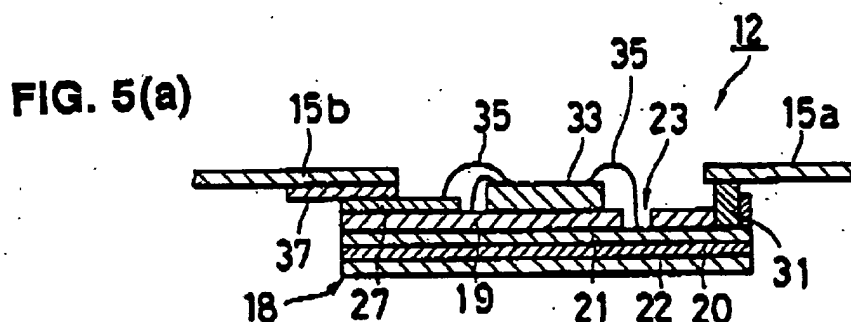
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 10 and 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Mita et al. (US 5,196,725).

4. Regarding claim 10, Mita (e.g. fig. 5a) shows a integrated circuit package comprising: a first lead frame 21; a second lead frame 15a/b laminated to a portion of the first lead frame in order to create a multi layer lead frame; and a semiconductor 33 mounted to another portion of the lead frame.



Claim Rejections - 35 USC § 103

5. Regarding to claim 12, Mita shows a third lead frame 22 laminated to at least a portion of the semiconductor device (i.e. bottom portion).

6. Regarding claim 13, Mita teaches that the first lead frame comprises a copper strip having silver plating on one surface (i.e. top surface of the lead 21) and the second lead frame is soldered to an opposed second surface (i.e. bottom surface of lead the 15; col. 3/lis. 13-16 & col. 6/lis. 1-13).

7. Regarding claim 14, Mita teaches that the second lead frame comprises a copper strip having solder plating on one surface (i.e. bottom surface of the lead 15a) and being soldered to the first lead frame an opposing second surface thereof (i.e. top surface of the lead 21; col. 5/lis. 1-10 & col. 6/lis. 44-60). Note that the bumps 31 may be formed on the lead 15 in advance and the bumps are formed by solder plating.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mita et al. (US 5,196,725) in view of Applicant Admitted Prior Art (hereafter APA) further in view Wolf.

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10. Mita shows most aspects of the instant invention except for contact balls mounted on the semiconductor die. Nevertheless, APA (e.g. fig. 1) shows a semiconductor device 22 having contact balls 30 mounted on the semiconductor die. According to Wolf some of the advantages of flip chip bonding (solder ball or C4) are: 1) the entire chip surface can be covered with solder bumps. In other words, bonding locations are not limited to the chip perimeter, thus more I/O capability is provided than by a perimeter interconnections on a die with the same size, and 2) the very short lengths of the chip to package interconnection paths minimizes their inductance (see Wolf pages 857-8). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use contact balls to make the electrical connections of the device disclosed by Mita in accordance with APA in order to provide more I/O capability and to minimize the inductance as suggested by Wolf.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mita et al. (US 5,196,725) in view Takekawa et al. (US 4,714,952).

12. Regarding claim 16, Mita shows most aspects of the instant invention except for the semiconductor die coated with at least one of titanium, tungsten, gold or a combination thereof for soldering. However, Takekawa discloses that a semiconductor die can be coated with gold to stabilize the potential to be produced at the lower surface of the substrate (col. 10/lls. 52-57). It would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the bottom surface of the semiconductor die disclosed by Mita with gold in order to stabilize the potential to be produced at the lower surface of the substrate as taught by Takekawa.

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Allowable Subject Matter

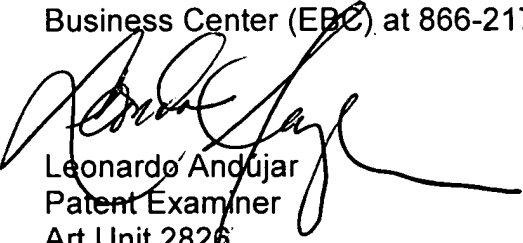
13. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.

15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC), at 866-217-9197 (toll-free).



Leonardo Andújar
Patent Examiner
Art Unit 2826
02/03/2005